RESTENOSIS AFTER ATHERECTOMY VERSUS PTCA: INITIAL EXPERIENCE.

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The atherectomy procedure has been used for nearly one year as treatment for coronary stenosis. Initial experience, with respect to restenosis, is described in 44 patients comprising 53 lesions with 100% 6 month angiographic follow-up. Each atherectomy patient was matched to at least one PTCA patient from the PTCA registry at the Mayo Clinic. The 248 PTCA patients were matched on the following parameters: location of lesion, percent stenosis, character of stenosis, history of restenosis, age, sex, and ejection fraction. The mean age was 64, and the mean ejection fraction was 64%. There were 73% males and 27% females. There were 62% LAD lesions, 4% circumflex lesions, 18% RCA lesions, and 16% grafts. The mean percent of stenosis pre-PTCA or pre-atherectomy was 86%. The lesions treated were restenotic PTCA lesions in 45% of the groups. The atherectomy patients were assessed for restenosis by angiography (restenosis defined as loss of 50% of initial gain); the PTCA patients were assessed by either angiography (30% of PTCA patients) or a positive nuclear exercise study in the affected area within 6 months of PTCA.

The six month restenosis rate in the atherectomy group was 42 $\pm$ 7%, and in the PTCA group, it was 27 $\pm$ 5% ($0.05 < p < 0.10$). Thus there is a suggestion of a significant difference in restenosis between procedures and comparable groups. Long term angiographic follow-up of the groups will be critical in comparing relative efficacy of both procedures.

MORPHOLOGIC ANALYSIS OF 506 CORONARY ATHERECTOMY SPECIMENS FROM 107 PATIENTS: HISTOLOGICALLY SIMILAR FINDINGS OF RESTENOSIS FOLLOWING PRIMARY BALLOON ANGIOPLASTY VERSUS PRIMARY ATHERECTOMY

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No morphologic information is available on atherectomy (athy) specimens obtained from human coronary arteries. Thus, we studied 506 specimens from 107 patients(pts) having coronary athy: 66 pts with restenosis following previous primary(1°) balloon angioplasty(PTCA),35 pts with athy of native obstructing material(1°athy), and 6 pts with restenosis of previous 1°athy sites. Athy material from previous PTCA restenosis sites consisted of atherosclerotic plaque(AP),intimal fibrous proliferation(IFP), ±thrombus(T) in 62(94%) and AP only in 4(6%). Of 35 pts with 1°athy, restenosis occurred in 6(33%) from 4-8 months (avg=6.5). Athy material from these 6 pts disclosed AP+IFP ±T in 100%. The IFP tissue at the restenosis sites was identical in pts with previous 1°PTCA or 1°athy.Of athy pts with previous 1°PTCA, vessel media measuring 59-220u in width(avg= 138) was present in 12%,whereas vessel media measuring 73-367u(avg=131)($p<.05$) was found in 50% of pts with previous 1° athy. Calcific deposits were present in 86% of pts with restenosis after 1°PTCA, 83% of pts with restenosis after 1°athy, and in only 61% of pts with 1° athy. CONCLUSIONS: 1.Histology of restenosis tissue after 1°PTCA is identical to that seen after 1°athy.2.Restenosis after 1°athy occurred slightly later (6.5months) compared to 1°PTCA (4.5months) but occurs at a similar frequency (33%).3.More vessel media is obtained when athy is done as a 1° procedure rather than for restenosis lesions(50% vs 12%, $p<.05$).

PATHOLOGY OF CORONARY ATHERECTOMY.

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Directed atherectomy of coronary artery disease permits the controlled excision and retrieval of stenosing lesions. Tissues removed from 167 coronary stenoses from 128 patients were studied by light microscopy. One hundred and thirty lesions from the coronary arteries proper included 54 primary stenoses and 76 restenoses after prior angioplasty. Thirty seven lesions were excised from vein grafts, including 15 primary and 22 post-angioplasty restenosis lesions. The microscopic pathology is shown below:

Lesion	No.	AS plaque	FIT	IH
Artery				
Primary	47	44 (94%)	0	3 (6%)
Restenosis	83	10 (12%)	0	73 (88%)
	130	54	0	76
Vein graft				
Primary	15	10 (67%)	5 (33%)	0
Restenosis	22	4 (18%)	2 (9%)	16 (73%)
	37	14	7	16

(AS plaque = atherosclerotic plaque, FIT = fibrous intimal thickening, IH = intimal hyperplasia)

AS plaques from primary artery lesions were more often calcified than graft stenoses (52% vs 20%, p=.07), while vein grafts had associated thrombus more often than primary arterial lesions (87% vs 47%, p=.016). Most arterial and vein graft restenoses were due to IH with smooth muscle cell proliferation. Organizing thrombus involved 59% of hyperplastic vein graft and only 22% of hyperplastic arterial restenoses (p=.009).Three left main primary arterial stenoses also showed IH; all three patients had had previous angioplasty of more distal left coronary segments. Study of samples excised by atherectomy can clarify the nature of vascular disease in individual patients and may aid our understanding of post-intervention restenosis.

Wednesday, March 21, 1990
2:00PM–3:30PM, Room 26
Prognosis After Myocardial Infarction

PREDICTING ARRHYTHMIC EVENTS AFTER MYOCARDIAL INFARCTION: RESULTS OF A PROSPECTIVE STUDY USING THE SIGNAL-AVERAGED ECG.

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The prognostic value of multiple clinical and noninvasive variables including the signal-averaged ECG (SAECG) was evaluated prospectively in 226 Pts enrolled after acute myocardial infarction. Patients underwent ambulatory ECG (AECG), measurement of ejection fraction (LVEF) and SAECG pre-hospital discharge. The SAECG was recorded from 3 orthogonal leads and to low noise (0.3 μV); analysis was performed on a 40 Hz highpass filtered vector magnitude. The total QRS duration (fQRS), RMS-voltage in the terminal 40 ms (V40) and the low amplitude signal duration <40 μV (LAS) were measured. The SAECG was abnormal if fQRS >110 ms, V40 <20 μV or LAS >38 ms. Because of bundle branch block, 22 Pts were excluded from analysis. Follow-up of 14 ± 7 months was complete in 182 Pts (age 65 ± 13 yrs) who comprise the study population of this report. RESULTS: The site of MI was anterior in 61 Pts, inferior in 63 Pts, non-Q-wave in 35 Pts and indeterminate in 23 Pts. The AECG had >10 VPDs/hr, couplets or unsustained ventricular tachycardia in 52 Pts (30%). The mean LVEF was 44% ± 15%, and the LVEF was <40% in 68 Pts (41%). The SAECG was abnormal in 71 Pts (41%). There were 16 arrhythmic events (10 sudden cardiac death, 4 sustained ventricular tachycardia and 2 aborted cardiac arrest) during follow-up. An abnormal SAECG had a sensitivity of 69%, specificity of 62%, negative/positive predictive value of 95%/15% and an odds ratio of 3.6 for arrhythmic events. By Cox proportional hazards model, there were 3 univariate predictors of an arrhythmic event: LVEF ($p = 0.031$), abnormal SAECG ($p = 0.03$) and fQRS ($p = 0.002$), but the only independent predictor of an arrhythmic event was the fQRS. CONCLUSION: (1) The SAECG and LVEF predicted the occurrence of serious arrhythmic events in patients after myocardial infarction. (2) The fQRS from the SAECG was the only independently significant prognostic variable.